

What is claimed is:

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for 1/24/2002
2/14/02

5 1. A metal-ceramic circuit board characterized by comprising a base plate of aluminum or aluminum alloy and a ceramic substrate board, wherein one surface of the ceramic substrate board is bonded directly to the base plate, and the base plate has a proof stress not higher than 320 (MPa) and a thickness not smaller than 1mm.

2. The metal-ceramic circuit board according to claim 1, wherein the other surface of the ceramic substrate board has a metal conductive member for an electronic circuit.

10 3. The metal-ceramic circuit board according to claim 2, wherein said conductive member is made of a material selected from copper, copper alloy, aluminum and aluminum alloy.

15 4. The metal-ceramic circuit board according to claim 1, wherein said ceramic substrate board is made of a material selected from alumina, aluminum nitride and silicon nitride.

5. The metal-ceramic circuit board according to claim 2, wherein said ceramic substrate board is made of a material selected from alumina, aluminum nitride and silicon nitride.

20 6. The metal-ceramic circuit board according to claim 3, wherein said ceramic substrate board is made of a material selected from alumina, aluminum nitride and silicon nitride.

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25 7. A power module characterized by comprising a base plate of aluminum or aluminum alloy, a ceramic substrate board, and a semiconductor tip wherein one surface of the ceramic substrate board is bonded directly to the base plate, said semiconductor tip is

provided on the other surface of said ceramic substrate board and the base plate has a proof stress not higher than 320 (MPa) and a thickness not smaller than 1mm.

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8. A method of manufacturing a metal-ceramic circuit board
5 characterized by comprising the steps of melting aluminum or
aluminum alloy in a vacuum or inert gas atmosphere to form a
molten metal, contacting one surface of a ceramic substrate board
directly with said molten metal in a vacuum or inert gas atmosphere,
and cooling said molten metal and said ceramic substrate board to
10 form a base plate of aluminum or aluminum alloy, which is bonded
directly on said one surface of the ceramic substrate board.

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9. A method of manufacturing a metal-ceramic circuit board
characterized by comprising the steps of melting aluminum or
aluminum alloy in a vacuum or inert gas atmosphere to form a
15 molten metal, contacting one surface of a ceramic substrate board
directly with said molten metal in a vacuum or inert gas atmosphere,
cooling said molten metal and said ceramic substrate board to form a
base plate of aluminum or aluminum alloy, which is bonded directly
on said one surface of the ceramic substrate board, and bonding a
20 conductive metal member for an electronic circuit on the other
surface of said ceramic substrate board by using a brazing material.

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10. A method of manufacturing a metal-ceramic circuit board
characterized by comprising the steps of melting aluminum or
aluminum alloy in a vacuum or inert gas atmosphere to form a
25 molten metal, contacting directly one surface of a ceramic substrate

board, on the other surface of which a conductive metal member for an electronic circuit being bonded by using a brazing material, with said molten metal in a vacuum or inert gas atmosphere, and cooling said molten metal and said ceramic substrate board to form a base plate of aluminum or aluminum alloy, which is bonded directly on said one surface of the ceramic substrate board.

227/24 11. A method of manufacturing a metal-ceramic circuit board characterized by comprising the steps of melting aluminum or aluminum alloy in a vacuum or inert gas atmosphere to form a molten metal, contacting one surface of a ceramic substrate board directly with said molten metal in a vacuum or inert gas atmosphere, cooling said molten metal and said ceramic substrate board to form a base plate of aluminum or aluminum alloy, which is bonded directly on said one surface of the ceramic substrate board, and bonding a conductive metal member for an electronic circuit on the other surface of said ceramic substrate board.

127/96 12. A method of manufacturing a metal-ceramic circuit board characterized by comprising the steps of melting aluminum or aluminum alloy in a vacuum or inert gas atmosphere to form a molten metal, contacting directly one surface of a ceramic substrate board, on the other surface of which a conductive metal member for an electronic circuit being bonded, with said molten metal in a vacuum or inert gas atmosphere, and cooling said molten metal and said ceramic substrate board to form a base plate of aluminum or aluminum alloy, which is bonded directly on said one surface of said

ceramic substrate board.

13. The method of manufacturing the metal-ceramic circuit board according to claim 8, wherein said ceramic substrate board is made of a material selected from alumina, aluminum nitride and silicon nitride.

14. The method of manufacturing the metal-ceramic circuit board according to claim 9, wherein said ceramic substrate board is made of a material selected from alumina, aluminum nitride and silicon nitride.

15. The method of manufacturing the metal-ceramic circuit board according to claim 10, wherein said ceramic substrate board is made of a material selected from alumina, aluminum nitride and silicon nitride.

16. The method of manufacturing the metal-ceramic circuit board according to claim 11, wherein said ceramic substrate board is made of a material selected from alumina, aluminum nitride and silicon nitride.

17. The method of manufacturing the metal-ceramic circuit board according to claim 12, wherein said ceramic substrate board is made of a material selected from alumina, aluminum nitride and silicon nitride.

18. The method of manufacturing the metal-ceramic circuit board according to claim 9, wherein said conductive metal member contains at least one metal selected from copper, copper alloy, aluminum, and aluminum alloy.

19. The method of manufacturing the metal-ceramic circuit board according to claim 10, wherein said conductive metal member contains at least one metal selected from copper, copper alloy, aluminum, and aluminum alloy.

5 20. The method of manufacturing the metal-ceramic circuit board according to claim 11, wherein said conductive metal member contains at least one metal selected from copper, copper alloy, aluminum, and aluminum alloy.

10 21. The method of manufacturing the metal-ceramic circuit board according to claim 12, wherein said conductive metal member contains at least one metal selected from copper, copper alloy, aluminum, and aluminum alloy.

228/256 22. A method of manufacturing a power module characterized by comprising the steps of melting aluminum or aluminum alloy in a vacuum or inert gas atmosphere to form a molten metal, contacting one surface of a ceramic substrate board directly with said molten metal in a vacuum or inert gas atmosphere, cooling said molten metal and said ceramic substrate board to form a base plate of aluminum or aluminum alloy, which is bonded directly on said one surface of the ceramic substrate board, forming a metal layer of desired pattern on the other surface of said ceramic substrate board, and fixing a semiconductor tip on said metal layer.

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